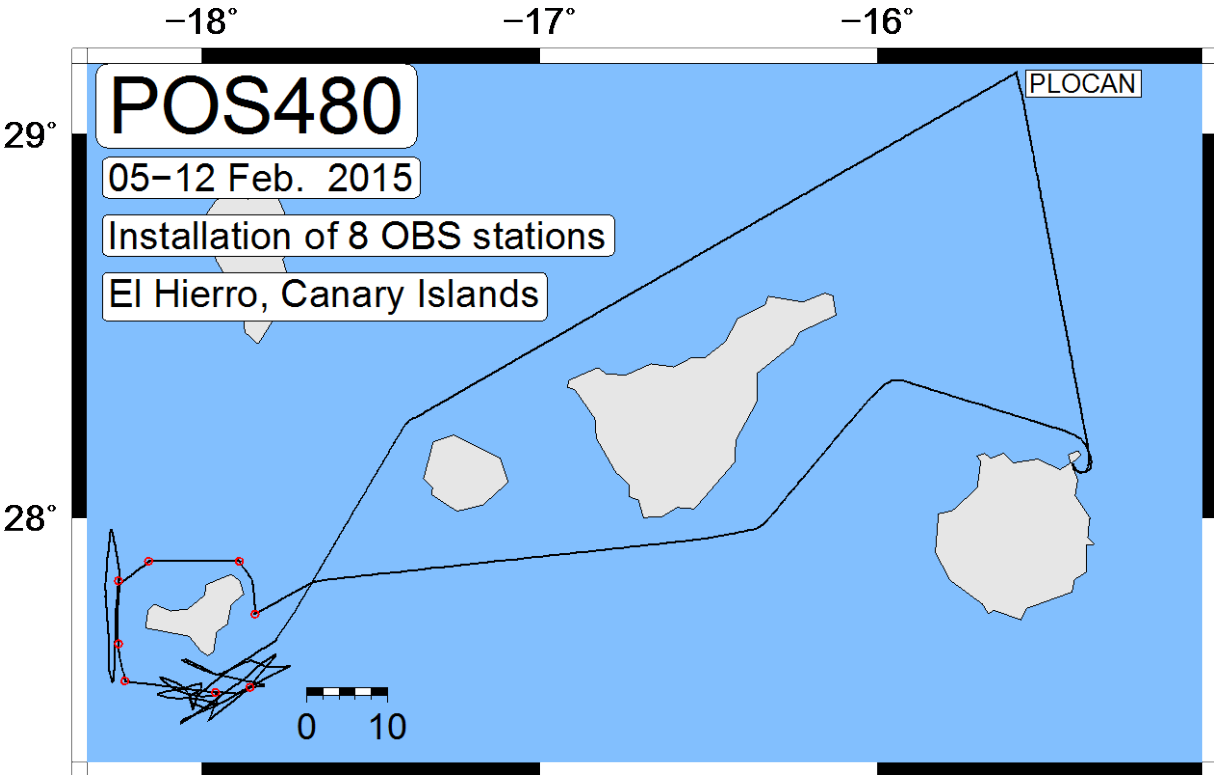
Cruise Summary Report, POS480

05th Feb. – 12th Feb., 2015

Las Palmas – Las Palmas (Spain)

Dietrich Lange

and cruise participants



Kiel, 7 July 2015

1.) Introduction

The ongoing unrest of el Hierro Islands started in 2011 with a submarine volcanic eruption 2 km South of El Hierro and poses a significant hazard potential for the island and its inhabitants. The spatial distribution of seismicity is highly variable and a significant part of is occurs outside the network or offshore. In order to better characterize the seismicity the seismological network was densied with 8 ocean bottom seismometers (OBS) during Poseidon cruise POS480. The permanent network of IGN was densified with 9 onshore stations in March 2015. Beside a better depth estimate of the seismicity OBS data will allow a better characterization of the seismic signals due to an improved spatial coverage of the Island and its surrounding. The offshore supplement of the network will enable a much more improved hypocentral estimate, which in turn will allow to resolve the structures involved in the current seismic unrest as well as its spatial temporal characterization. OBS stations will be deinstalled early 2016. Swath bathymetry mapping of the 2011 eruption site was planned to reveal bathymetriy changes related to the growth of the new volcanic cone offshore the southern tip of ElHierro's coast. Additionally, we planned to use the multibeam system to monitor for upwelling gas flares in the water column.

During the cruise **8 OBS stations** were installed. The stations are equipped with lithium batteries which allow to register local seismicity for a period of 12 months. The deinstallation of the OBS is planned for log1 of Poseidon cruise POS 494 (04 February 2016 until 08 February 2016). Following the diplomatic clearance **no multibeam** data was measured.

2.) Narrative of cruise POS480

Poseidon left the harbour of Las Palmas de Gran Canaria, Spain on Thursday February 5, 2015 at 09:18 local time which equals the UTC time zone. Weather conditions during the ~160 nm transit to ElHierro were reasonable good. On February 6 at 08:00 Poseidon arrived at the northeastern side of ElHierro where a releaser test was conducted at water depths of 1000 m. All releasers, including the spare releaser, opened after the first release code signal. Due to restrictions in in the diplomatic clearance no multibeam survey was conducted. We decided to install the OBS stations sailing anticlockwise around the island. On February 6 we installed the first OBS station (OBS2) and continue the same day with OBS1 and OBS8. The state of sea was very calm during the whole time until the end oft the cruise in Las Palmas. On February 7 we installed further 4 stations (OBS7, OBS6, OBS5 and OBS4). Finally the last station (OBS3) was installed on February 8 at 08:00. Therefore the ship took a waiting position from Sunday 8 in the morning until February 10 waiting for diplomatic clearance on our request if the diplomatic clearance is meant to exclude multibeam mapping of ElHierro’s volcanic eruption site of 2011. On February 10 Poseidon left from ElHierro at 18:17 to the transit of ESTOC mooring operated by PLOCAN (Telde de Gran Canaria), which has ceased data transmission December 22, 2014. Poseidon arrived at 14:20 at the mooring station ESTOC stations (http://siboy.plocan.eu/ESTOC) during optimal weather conditions (1 meter of swell, wind 3 Bft, visibility 15 nm). Poseidon executed search patterns in the vicinity oft he given position oft the buoy with radar surveillance and optical search of the adjacent area. However, the ESTOC stations could not be located at its mooring position. Thereafter, Poseidon headed towards Las Palmas de Gran Canaria, reaching port in the evening of February 21, 2015. At 21:00 Poseidon was fixed at pier in Las Palmas.

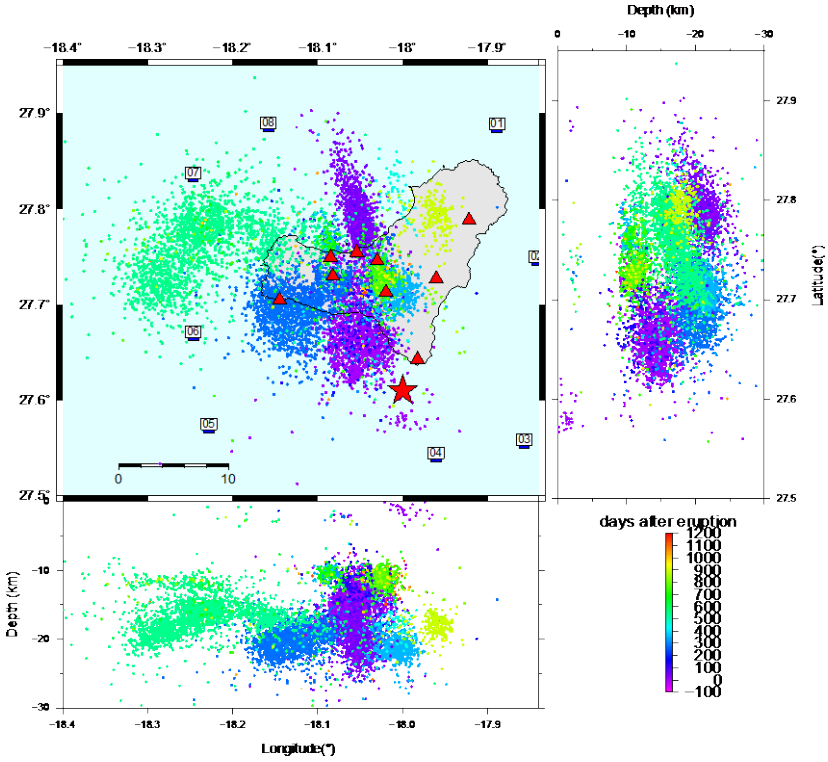


Fig. 2: *Location oft the 8 OBS deployed offshore ElHierro. OBS stations are shown with green symbols and are labelled with their numbers. Red triangles indicate permanent landstations from IGN. Seismicity in the region of ElHierro Island between 01/06/2010 and 07/02/2015 (IGN catalogue) is shown with small circles. Depth of the events is shown for N-S cross-sections (top right panel) and E-W striking cross-section (bottom panel). The red star indicates the location of the submarine eruption in starting 10 October 2011.*

3.) Participants

3.1.) Ship's crew

1.	GÜNTHER, Matthias	Master
2.	GRIESE, Theo	Chief Officer
3.	FRANKE, Remo	2nd Officer
4.	FREUD, Hans-Jörg	Chief Engineer
5.	STEGMANN, Tim	2. Eng.
6.	BAUMANN, Frank	Electrician
7.	ENGEL, Rüdiger	Motorman
8.	MISCHKER, Joachim	Bosun
9.	MEYER, Felix	SM
10.	KUHN, Ronald	AB
11.	MEILING, Ralf	SM
12.	RAUH, Bernd	SM
13.	BISCHECK, Olaf	AB
14.	MALCHOW, Klaus-Peter	Cook
15.	SCHMANDKE, Harald	Steward

3.2 Scientific crew

1.	Lange, Dietrich	GEOMAR	Chief Scientist
2.	Krabbenhoeft, Anne	GEOMAR	OBS
3.	Schneider von Deimling, Jens	GEOMAR	Multibeam
4.	Rebaza Morillo,Anna Mireia	Univ. de Barcelona	Student

5. Instrument	Coordinates		
	Lat. N	Lon. W	Depth (m)
OBS 01	27°53.119	17°53.347	1584.9
OBS 02	27°44.763	17°50.518	1851.0
OBS 03	27°33.249	17°51.420	3075.0
OBS 04	27°32.42	17°57.66	1062.2
OBS 05	27°34.234	18°13.684	3149.0
OBS 06	27°40.049	18°14.79	2549.0
OBS 07	27°50.025	18°14.803	2700.0
OBS 08	27°53.157	18°09.498	2745.0

Tab. 1: *List of Ocean-Bottom-Seismometers (OBS) deployed during POS480. Location of stations is shown on the front page and in Fig. 2.*

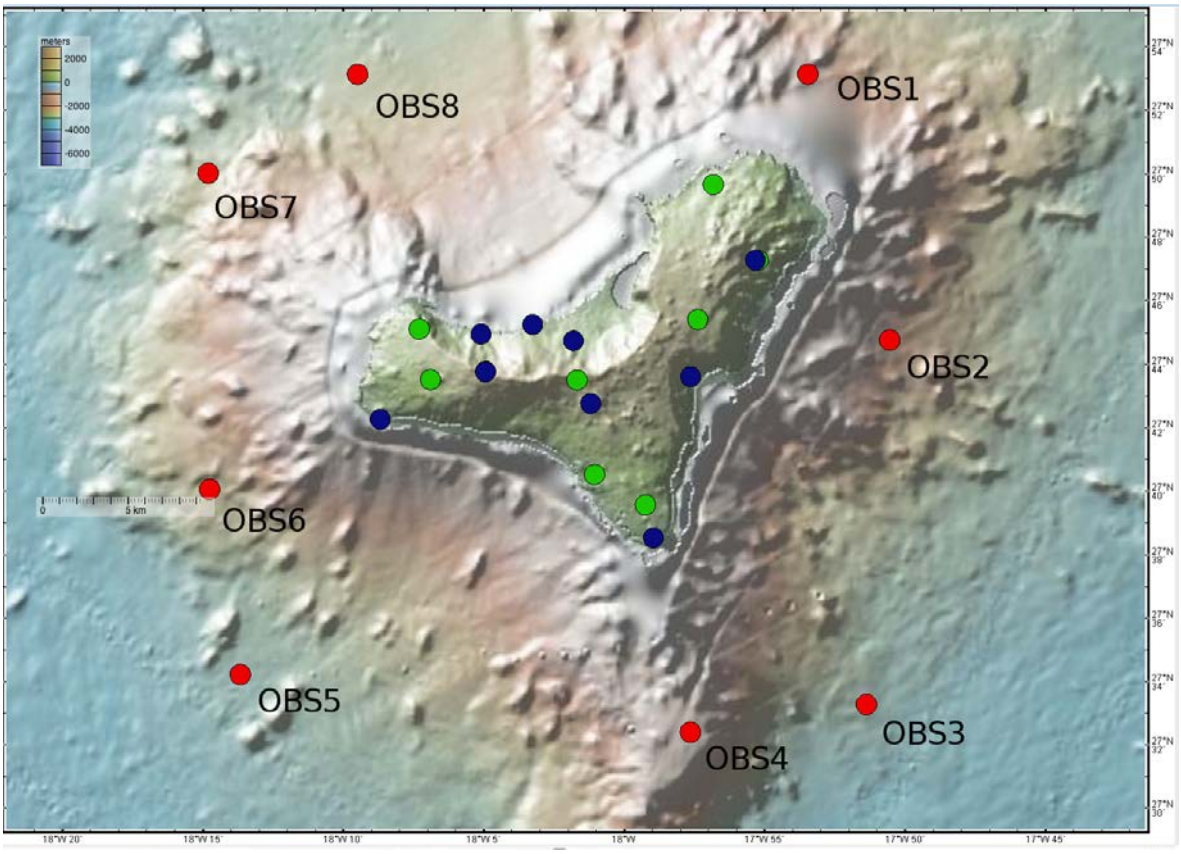


Fig. 3: *Map of ElHierro showing the location of the 8 OBS stations (red circles). Blue circles: permanent landstations from IGN; Blue circles: Landstations installed by GEOMAR in March 2016.*

Acknowledgments

We are thank Master Mattes Günther, and crew of the RV Poseidon cruise POS480 for excellent sea-going support and a great working environment.